**Problem 1.** There are 2015 potatoes in a basket. If you can only take out 11 at a time, what is the minimum number of potatoes you can leave in the basket?

Problem 2. A $8 \times 8 \times 8$ cube is cut up into unit cubes, and one is randomly removed. What is the probability that the cube still looks the same from the outside? (Ignore the effects of gravity, i.e. cubes will stay floating.)

Problem 3. Candide has 120 pieces of candy. In how many ways can Candide split all of his candies into equally sized pile(s)? (Two examples are 1 pile of 120 pieces, and 20 piles of 6 pieces.)

Problem 4. What is the area of the figure below, if it is made up of two overlapping squares of side length 10?
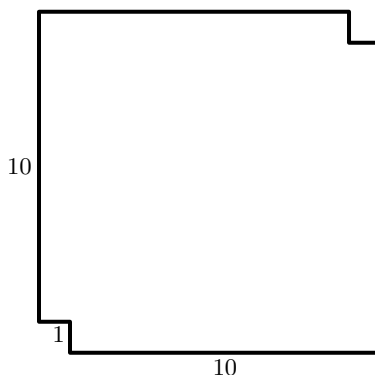
Problem 5. Lilian and Katherine are both expert moppers, and after a gust of wind swept through a mathematics room at CMU, they volunteered to sweep up the 100 math problems now on the floor. Of the 100 math problems, 50 of them involved algebra, 30 involved geometry, and 12 involved both algebra and geometry. Out of curiosity, they randomly picked up a problem on the floor and read it. Given that the problem did not involve both algebra and geometry, what is the probability that the problem involved algebra?

Problem 6. TJHSST is currently selling biology, chemistry, and physics textbooks. Bary-Centric the biologist buys 3 biology, 1 chemistry, and 1 physics textbook for \$100. Carrie the chemist buys 1 biology, 3 chemistry, and 1 physics textbook for \$200. Finally, Parry the physicist buys 1 biology, 1 chemistry, and 3 physics textbooks for \$300. How many cents does 1 biology, 1 chemistry, and 1 physics textbook cost?

Problem 7. A, B, C, D, E, and F want to sit at a round table with 6 equally spaced out seats. However, A and B cannot sit directly across each other. If the rotation of the table doesn't matter (ABCDEF is identical to BCDEFA), how many ways are there for the 6 people to sit?

Problem 8. The figure below shows an isosceles triangle ABC and its inscribed circle O. Given that OD = 3 and AE = 4, where D is the midpoint of BC and E is the point of tangency of the circle with side AC, find OC. Express your answer in simplest radical form. (Note: Figure not drawn to scale.)

Problem 9. Archer is currently doing target practice. Archer is also extremely accurate, as he has a $\frac{9}{10}$ chance of hitting the bulls-eye of a target. If Archer has set up 3 targets for himself, what is the chance that he will only hit 1 bulls-eye of a target?

Time limit: 30 minutes.
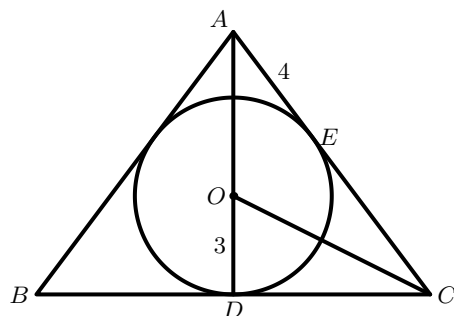
Problem 10. Winston and Allen are playing a game with Allen's collection of 2015 tennis racquets that are numbered from 1 to 2015. Allen will choose a tennis racquet at random and will tell Winston the number of factors of 5 it has. Winston wins if he correctly guesses the number on the tennis racquet given what Allen tells him. If Winston guesses one of the racquets which agrees with Allen's statement, what is the probability that Winston will guess the right racquet number?